PROPOSED MODIFICATION OF

KING COUNTY AIRPORT SLUDGE APPLICATION WORKPLAN

The initial dewatered sludge application effort at Boeing Field this summer completed all designated areas except sections numbered 1, 4, 6 and 20 and a portion of section 10 (see original workplan for numbering system). These untreated areas total approximately 48 acres. The application rate has been about 11 dry tons/acre.

The proposed continuation of this effort would utilize undewatered digested sludge (6 to 9% solids) from the Alki Treatment Plant. The Alki Treatment Plant produces 2 truckloads of sludge each week. (A truckload holds a maximum of 24 wet tons, just under 2 dry tons.) This material will be applied by "splash-plate" and will infiltrate into the turf without further spreading, easing the demands on the airport maintenance staff. The dewatered sludge currently used could only be applied during dry summer weather so that rapid drying would reduce the potential for surface runoff and odor problems. The Alki sludge could be applied in wet weather with proper precautions.

Application of Alki sludge in wet weather will be confined to areas that minimize the possibility of surface saturation to avoid any overland flow. Wet weather may be defined as a 7-day period with 1.5" of precipitation total of a 2-day period with 1" of precipitation. Although the surface soils at the airport (2 to 6 feet deep) are generally quite porous, the less permeable silty layer below may trap a considerable amount of groundwater during prolonged wet weather. Water has been observed collecting in a depression in the southwest corner of the airport (between 6 and 9 feet above sea level). Thus, areas less than 10 feet above sea level will be avoided during wet weather. Weekly monitoring for saturated conditions (ie: puddle formation) will be conducted by Metro personnel.

Fortunately, several large sections of the airport site would be appropriate for wet weather operations. These are sections 20, 19, 16, 7 5 and 1 (63.5 acres total). The other sections will be reserved for dry weather application only.

It is conceivable that prolonged heavy rainfall or snowfall may close the entire site to sludge application. This contingency will be met by transporting the Alki sludge produced during those periods to a forest application site lagoon (the O'Neill site in Thurston County) to dilute the dewatered sludge for easier spray application. Cedar Hills landfill is another alternate destination for Alki sludge.

The Alki sludge contains approximately the same concentration of nutrients (Nitrogen and phosphorus), on a dry weight basis, as the dewatered sludge from West Point. Metal contaminants are drastically reduced since Alki receives input from predominantly domestic sources.

As discussed in the original workplan, the application rate is based on matching the amount of N that becomes available for plant uptake to the published uptake rates of grasses. If more nitrogen is released from the sludge than can be utilized by the turf, there is a possibility that the excess will be carried into the groundwater. An EPA document (Sludge Treatment and Disposal, Vol. 2, 1978) reports above ground (excluding root system) nitrogen requirements for grasses ranges from 150 to 300 lbs. N/acre each year. Root uptake and soil storage are not accounted for in these rates.

Using an uptake estimate of 200 lbs. N/acre each year, a 0.5-inch (5 dry tons of sludge/acre) application should result in no nitrogen loss to the groundwater (See Table 1). In fact, reapplication during the second growing season (when 50 lbs. N/acre becomes available from the first 0.5-inch application) would result in less than 170 lbs. N/acre becoming available to the grass and no leaching loss to the groundwater.

For areas that received 11 dry tons/acre of dewatered sludge during the summer of 1981, reapplication of Alke sludge must be limited to approximately 2.5 dry tons/acre to avoid loss of excess N. During the 1983 growing season, less N will be available from the initial 11 dry ton/acre rate, and Alki sludge can be applied at the 5 dry ton/acre rate. The project duration is not planned beyond the 1983 growing season, when the success of the project will be evaluated.

An entire year's production of Alki sludge (208 dry tons) will require only 42 acres at a 5 dry ton/acre rate. Assuming that this phase of the airport project begins in October, 1981, reapplication will not be necessary until November, 1982. Reapplication rates will be limited to 2.5 dry tons/acre in areas that received the dewatered sludge application in 1981.

Sludge application operations will be directed by Metro employees with consultation from the airport staff. Splash-plate application will be directly from Metro vehicles operated by drivers working for Metro. The precautions discussed in the original workplan will remain unchanged. Inadequate collection of surface runoff in catch basins unaffected by parking lot and taxiway runoff prevents effective surface water monitoring. Microbial populations in treated and non-treated areas will continue to be sampled on a quarterly basis.

The project is scheduled to run from October, 1981 through May, 198

TABLE 1 Nitrogen Transformations during First Year after Sludge Application.

N available for plant uptake = initial NH_3-N minus volatilized NH_3-N, plus mineralized N

Application Rate dry tons/ acre	wet tons/ acre	ins.	ALL IN LBS. N/ACRE Initial Total N	Initial Organic N	Initial NH_3-N	Volatilized NH_3-N (50% lost to atmosphere)	Mineralized N (20% of Organic N)	Organic N Remaining After Year 1	N Available in Year 1
11	(133)	1.2"	942	694	248	124	139	555	263
10	(121)	1.0"	856	631	225	112	126	505	239
5	(60)	0.5"	428	315	113	56	63	252	119
2.5	(30)	0.25"	214	158	56	28	32	126	60

TABLE 2 Nitrogen Transformations, Years 2 through 4 (Lbs. N/Acre)

Application Rate dry tons/ acre	wet tons/ acre	ins.	Organic N Remaining After Year 1	N Mineralized in Year 2 (available for plant uptake)	Organic N Remaining After Year 2	N Mineralized During Year 3	Organic N Remaining After Year 3	N Mineralized During Year 4
11	(133)	1.2"	555	111	444	89	355	70
10	(121)	1.0"	505	101	404	81	323	65
5	(60)	0.5"	252	51	201	40	161	32
2.5	(30)	0.25"	126	25	101	20	81	16

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